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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to a Vacuum Cleaner

We, SIEMENS-ELECTROGERÄTE GESELLSCHAFT MIT BESCHRANKTER HAFTUNG, formerly Siemens-Electrogerate Aktiengesellschaft, a German Company of Berlin and Munich, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to vacuum cleaners.

According to the present invention there is provided a vacuum cleaner having a cylindrical flow chamber provided with opposed end walls, one of these end walls being closed apart from an air intake pipe that opens into the chamber through this end wall and the other of these end walls being closed apart from a suction duct that passes therethrough, said pipe being directed at an acute angle relative to the longitudinal axis of the chamber and tangentially relative to the curved wall of the chamber, and said suction duct being disposed coaxially in the flow chamber and surrounding a suction fan.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawing, in which:

Figure 1 is a diagrammatical side view, taken in section, of a first form of vacuum cleaner, and

Figure 2 is a similar view of a second form of vacuum cleaner,

The vacuum cleaner shown in Figure 1 has a cylindrical flow chamber 1 which has end walls 2 and 3. The end wall 2 is closed apart from an intake or inlet duct 4 that opens into the wall 2. This duct 4 is inclined at an acute angle to the longitudinal axis of the chamber 1, and is directed tangentially relatively to the curved wall of the chamber. The end wall 3 is also closed apart from a suction duct 5 that is disposed centrally in the flow chamber 1, and which is formed by a hollow cylinder that passes through the wall 3. The duct 5 contains a fan 6. At its end projecting into the flow chamber 1, the suction duct 5 has a tubular extension 7 whose internal diameter is smaller than that of the suction duct 5 and whose external surface is shaped in the manner of an annular ring or swelling 8. Opposite the free end of the extension 7 there is secured, on the internal side of the end wall 2, a hollow stub cylinder 9 into which the free end of the extension 7 is entered, said end being closed by a replaceable filter 10, preferably a fine filter. Disposed at the place where the suction duct 5 is connected to the extension 7, is a disc-shaped baffle 11 which sub-divides the flow chamber 1 into two compartments 13 and 14 communicating with one another through an annular gap 12.

The end of the suction duct 5 which passes through the wall 3 of the flow chamber 1, is secured on a base plate 15 in such a manner that there is formed between the end wall 3 and the base plate 15, a gap 16 into which apertures 17, formed in the suction duct 5 open. To facilitate the movement of the vacuum cleaner, the base plate 15 is provided with rollers or wheels 18.

In operation, the air flow, mixed with dust, which is drawn in by the fan 6 through the intake duct 4 into the flow chamber 1 forms, owing to the positioning of the intake duct 4, a helical flow or vortex which progresses, *via* the annular gap 12, towards the lower end wall 3 and, in the region of the wall 3, reverses and forms an upwardly directed helical flow concentric with the descending flow.

In the mixing zone between the descend-

[*Price 4s. 6d.*]

ing flow system and the ascending flow system moving concentrically therewith, the dust carried by the in-drawn air is separated-out and descends into the lower region of the chamber compartment 13. The baffle 11 deflects the ascending helical flow outwardly so that in the region of the annular gap 12 the two flows which are moving in opposite directions to one another, but rotating in the same sense, are brought into intensive contact. In this region of the flow chamber, dust residues which have not been separated-out in the mixed flow system in the region of the chamber compartment 13 are taken-up by the descending flow and re-introduced into the separating process. Besides the helical flow entering the lower chamber compartment 13, which flow includes the main proportion of the indrawn air, there forms in the upper compartment 14 a further helical flow which is formed by air quantities which fan out from the general flow direction as "stray" flow veins on entering the flow chamber. This is so because the external surface shape of the swelling 8 produces a vortex, downstream of the main helical flow, in which the residual dust is separated-out. This vortex also takes-up the flow components which divide from the helical flow on entry into the flow chamber and whose dust content would escape without the provision of the downstream vortex. The effect of this annular swelling is augmented by the hollow cylinder 9. The dust contained in this flow is separated-out in the region of the annular swelling 8 so that the filter 10 closing the extension 7 is merely used to provide complete reliability, since the air drawn from the flow chamber 1 by the fan 6 is already substantially free of dust before the filter 10. The purified discharge air is blown out through apertures 17 into the gap 16 between the end wall 3 and the base plate 15. Since the blown-out air is distributed over the entire cross-section of the gap 16, its flow speed at the gap outlet is very low.

The second form shown in Figure 2 has similarities with the first embodiment and corresponding parts are designated by the same reference numerals. However, the second embodiment differs from the first embodiment described in that the flow chamber 1 is secured releasably to the base plate 15. For this purpose, annular grooves 19 and 20 are provided on a fan casing 6A and the suction duct 5, and a sealing ring 21 is inserted in these grooves. The fan casing 6A contains a fan (not shown) corresponding to the fan 6 described above. By means of a handle 22 the flow chamber 1 can be removed, from the base plate 15 and the fan casing 6A which is connected rigidly thereto, by overcoming the retaining action of the sealing ring 21. When the flow chamber 1 has been lifted-off, it can be carried as a closed dust container to a suitable place of emptying, such as a dustbin. The end wall or bottom 3 is mounted on the side wall so as to be pivotable about a hinge 23, in order to empty the flow chamber 1. At the p-posite side from the hinge 23 there is provided at the other side of the flow chamber 1 a locking rod 24 with which a guide 25 and an operating handle 26 are coupled. By means of the locking rod 24, the bottom 3 of the flow chamber 1 can be opened and closed again by operating the handle 26. The flow chamber 1 is replaced on the base plate 15 after emptying, the sealing 21 locking into the annular grooves 19 and 20 and thus fixing the flow chamber 1 in position. The vacuum cleaner is then ready for operation again.

In a modification of the above the bottom 3 can be of multi-part construction, in which case only some, or all of the parts may be hinged.

WHAT WE CLAIM IS:—

1. A vacuum cleaner having a cylindrical flow chamber provided with opposed end walls, one of these end walls being closed apart from an air intake pipe that opens into the chamber through this end wall and the other of these end walls being closed apart from a suction duct that passes therethrough; said pipe being directed at an acute angle relative to the longitudinal axis of the chamber and tangentially relative to the curved wall of the chamber, and said suction duct being disposed coaxially in the flow chamber and surrounding a suction fan.

2. A vacuum cleaner as claimed in claim 1, wherein in the flow chamber, at an end of the suction duct remote from said other end wall of the flow chamber, a disc-shaped baffle is arranged extending transversely of the longitudinal axis of the chamber and sub-dividing the flow chamber into two compartments communicating with one another through an annular gap.

3. A vacuum cleaner as claimed in claim 1 or 2, wherein an end of the suction duct which projects beyond said other end wall of the flow chamber is so connected to a base plate that a gap is formed between this wall and the base plate.

4. A vacuum cleaner as claimed in claim 3, wherein the suction duct is closed by the base plate and apertures are formed in a wall of the duct, which apertures are arranged in the gap between the base plate and the flow chamber.

5. A vacuum cleaner as claimed in claim 3 or 4, wherein the base plate is movable over the ground on runners or rollers mounted on the base plate.

6. A vacuum cleaner as claimed in claim 1 or 2, wherein the flow chamber is con-

nected releasably to a base plate and a casing of the suction fan.

7. A vacuum cleaner as claimed in claim 6 when appendant to claim 2, wherein between the fan casing and the wall of the suction duct a sealing ring is arranged.

8. A vacuum cleaner as claimed in claim 7, wherein the sealing ring engages in annular grooves in the fan casing and in the wall of the suction duct.

9. A vacuum cleaner as claimed in claim 2 or any one of claims 3 to 5 when appendant to claim 2, wherein a replaceable protective filter is arranged in the region of the baffle.

10. A vacuum cleaner as claimed in any one of claims 6 to 8, wherein said other end wall is hingedly mounted and is adapted to be locked in a position to close the flow chamber.

11. A vacuum cleaner as claimed in claim 10, wherein said other end wall is of multipart construction, at least one of these parts being hinged and being adapted to be locked in said position to close the flow chamber.

12. A vacuum cleaner substantially as hereinbefore described with reference to Figure 1 or Figure 2 of the accompanying drawing.

HASELTINE, LAKE & CO.,
Chartered Patent Agents,
28 Southampton Buildings,
Chancery Lane,
London, W.C.2.,
Agents for the Applicants.

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1111074 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

Fig.1

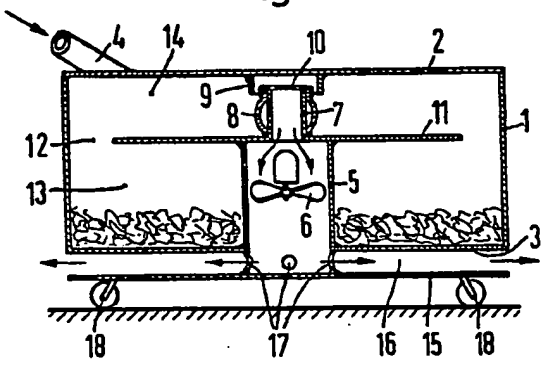

Fig.2